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ANNCR: THE VOICE OF AMERICA PRESENTS: SCIENCE NOTEBOOK.
 A SUMMARY OF EVENTS IN SCIENCE, MEDICINE AND TECHNOLOGY.
 EACH WEEK AT THIS TIME, WE BRING YOU REPORTS ON
 DEVELOPMENTS THAT MAY AFFECT OUR DAILY LIVES. WITH THE
 FIRST STORY, HERE IS YOUR SCIENCE EDITOR -----.

(LASER COMMUNICATION IN SPACE -- 3-2581 -- DOSA)

EDITOR: LASER, THE HIGH-INTENSITY, STRAIGHT BEAM OF LIGHT
 WHICH DOES NOT SCATTER EVEN OVER LONG DISTANCES, MAY
 BECOME A MAJOR MEANS OF COMMUNICATIONS. AMERICAN ASTRONAUTS
 HAVE LEFT SPECIAL MIRRORS ON THE MOON TO REFLECT LASER
 BEAMS SENT FROM EARTH. SKYLAB ASTRONAUTS HAVE BEEN
 EXPERIMENTING WITH LASER SIGNALS ABOARD THEIR EARTH-
 ORBITING SPACE STATION. MORE RECENTLY, THE UNITED
 STATES AIR FORCE ANNOUNCED THE CONVERSION OF A LARGE
 TELESCOPE TO TEST A NEW SYSTEM FOR LASER COMMUNICATIONS
 IN SPACE.

LOCATED NEARLY THREE-THOUSAND METERS ABOVE SEA-LEVEL
 IN THE MOUNTAINS OF NEW MEXICO, THE CLOUDCROFT
 TELESCOPE WAS BUILT TEN YEARS AGO FOR TRACKING RAPIDLY
 MOVING SATELLITES. IT IS CAPABLE OF RECOGNIZING OBJECTS
 AS MUCH AS ONE-THOUSAND KILOMETERS ABOVE THE EARTH.
 IN THE NEW, EXPERIMENTAL PROGRAM, THE CLOUDCROFT

EDITOR: TELESCOPE WILL RECEIVE LASER BEAMS CARRYING DATA
(CONT'D) AND OTHER INFORMATION AT AN ASTONISHING SPEED.

THE LASER COMMUNICATION SYSTEM WILL TRANSMIT IN ONE SECOND ENOUGH INFORMATION TO FILL A SIXTY-EIGHT VOLUME ENCYCLOPEDIA, BETWEEN EARTH-ORBITING SATELLITES, OR TO A GROUND STATION. EACH OF THE ONE-THOUSAND-MILLION BITS OF INFORMATION TRANSMITTED EVERY SECOND IS SIMILAR TO ONE PULSE OF ELECTRICAL ENERGY BEING TRANSMITTED, SUCH AS ONE CLICK OF A TELEGRAPHER'S KEY SENDING IN MORSE CODE.

PRESENT-DAY COMMUNICATIONS SATELLITES, SUCH AS THOSE OF THE INTELSAT SERIES, CAN CARRY ABOUT EIGHT-THOUSAND TELEPHONE MESSAGES, OR TWO COLOR TELEVISION PROGRAMS SIMULTANEOUSLY. THE LASER COMMUNICATION SYSTEM WILL HAVE A SIX-TIMES LARGER CAPACITY, MAKING IT -- IN THE WORDS OF AN AIR FORCE OFFICIAL -- THE MOST ADVANCED COMMUNICATION SYSTEM EVER TO BE DEVELOPED."

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(NEW HOPE FOR ALLERGIES -- 3-2581 -- PARISI)
ANNCR: MORE THAN THIRTY-FIVE-MILLION AMERICANS -- NEARLY ONE OUT OF SEVEN -- SUFFER FROM VARIOUS ALLERGIES, CAUSED BY POLLEN, DUST, FEATHERS, FUR, AND A HOST OF OTHER THINGS. UNTIL RECENTLY, THERE WAS NOT MUCH THAT COULD BE DONE ABOUT IT. BUT, AS VOA'S JIM PARISI REPORTS, A BIG CHANGE MAY BE IN THE OFFING...

VOICE: PROFESSOR ROBERT HAMBURGER, AN EXPERT IN ALLERGIES AT THE UNIVERSITY OF CALIFORNIA, SAN DIEGO, SAYS THAT A NEW DRUG HAS THE POTENTIAL FOR BRINGING RELIEF TO MOST ALLERGIES, PERHAPS FREEING MANY OF US FROM ATTACKS OF SNEEZING, ITCHING AND SIMILAR UNPLEASANT SYMPTOMS. THE VILLAIN THAT SEEMS TO BRING ON THESE ALLERGIC REACTIONS IS A GROUP OF PROTEIN MOLECULES IN THE BODY, CALLED IMMUNOGLOBULIN-E.

THESE ARE VERY LARGE MOLECULES, CONTAINING AS MANY AS FIVE-HUNDRED-SEVENTY-FIVE AMINO ACIDS, THE BASIC BUILDING BLOCKS OF LIFE. IMMUNOGLOBULIN-E IS MANUFACTURED BY THE HUMAN BODY TO FIGHT OFF INVASIONS BY FOREIGN SUBSTANCES, LIKE BACTERIA. THEY ATTACH THEMSELVES TO BODY CELLS -- ON THE SKIN, LUNGS, AND SO ON -- STANDING GUARD OVER OUR HEALTH. BUT THE TROUBLE IS THAT ONCE THEY SETTLE IN, THEY MAY ALSO ACTIVATE THE RELEASE OF A CHEMICAL CALLED HISTAMINE WHICH, IN TURN, CAUSES THE ALLERGY REACTION.

SOME TIME AGO, IT WAS DISCOVERED THAT ONE PARTICULAR TYPE OF IMMUNOGLOBULIN-E DOES NOT CAUSE ALLERGIC REACTION. DOCTOR HAMBURGER DECIDED TO LEARN AS MUCH AS HE COULD ABOUT IT. HE FOUND THAT IF THE NON-ALLERGIC PROTEIN IS THE FIRST TO ATTACH ITSELF TO A CELL, IT ACTS AS A SHIELD TO KEEP THE ALLERGY-CAUSING IMMUNOGLOBULINS AWAY, THUS PREVENTING THE ALLERGIC REACTION. IN EFFECT, THIS BREAKS THE ALLERGY CHAIN.

VOICE:
(CONT'D)

SO FAR, DOCTOR HAMBURGER TESTED HIS DISCOVERY ON JUST A FEW HUMAN VOLUNTEERS -- INCLUDING HIMSELF, HIS FAMILY AND SOME OF HIS COLLEAGUES. IN EVERY CASE, THE TEST WAS SUCCESSFUL, THE ALLERGIC REACTION DID NOT COME ABOUT, NOR DID THE VOLUNTEERS EXPERIENCE ANY SIDE EFFECTS. AND ANIMAL EXPERIMENTS, WITH LARGER DOSES OF THE ANTI-ALLERGY SUBSTANCE, WERE EQUALLY SUCCESSFUL.

MANY TESTS, PERHAPS TAKING SEVERAL YEARS, WILL BE REQUIRED BEFORE THE DRUG CAN BE APPROVED FOR GENERAL USE. THAT MAY BE LITTLE COMFORT TO THOSE WHO SUFFER FROM ALLERGIES TODAY. BUT EVEN THAT IS MUCH BETTER THAN NO HOPE AT ALL.

(SOLAR HEATED SCHOOL -- 3-2581 -- WHIPKEY/ATLANTA)

EDITOR: ENERGY FROM THE SUN IS BEING USED TO HEAT AND COOL A PUBLIC SCHOOL BUILDING IN ATLANTA, GEORGIA. JIM WHIPKEY REPORTS:

VOICE: IT IS DESCRIBED AS THE WORLD'S LARGEST SOLAR HEATING AND COOLING SYSTEM AND OFFICIALS OF THE FIRM WHICH INSTALLED IT CLAIM IT WILL PROVIDE SIXTY PERCENT OF THE SCHOOL'S ENERGY NEEDS.

THE U-S ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION, IN COOPERATION WITH GEORGIA TECHNOLOGICAL UNIVERSITY AND WESTINGHOUSE ELECTRIC CORPORATION, PROVIDED THE FACILITY AT TOWNS ELEMENTARY SCHOOL. THE SYSTEM HAS BEEN IN OPERATION FOR SEVERAL MONTHS AND SCHOOL

VOICE:
(CONT'D)

OFFICIALS SAY IT ADEQUATELY PROVIDES HEATING AND COOLING ENERGY FOR THE SCHOOL.

FIVE-HUNDRED SOLAR PANELS WERE INSTALLED ON THE ROOF OF THE ONE-STORY SCHOOL AND THE SYSTEM CAN STORE ENERGY GENERATED BY THE PANELS FOR AS LONG AS FORTY-EIGHT HOURS.

THE ATLANTA SCHOOL WAS SELECTED BECAUSE IT IS REPRESENTATIVE OF THE CLIMATIC AND INSULATION CHARACTERISTICS OF SUCH BUILDINGS IN A LARGE PORTION OF THE UNITED STATES WHERE -- DEPENDING ON THE SEASON -- BOTH HEATING AND COOLING ARE REQUIRED.

AT DEDICATION CEREMONIES HELD RECENTLY AT THE TOWNS ELEMENTARY SCHOOL IN ATLANTA, DOCTOR JOHN TEEM, ASSISTANT ADMINISTRATOR FOR THE SOLAR, GEOTHERMAL AND ADVANCED ENERGY SYSTEMS OF THE FEDERAL ENERGY AND RESEARCH DEVELOPMENT ADMINISTRATION, SAID THE SIGNIFICANCE OF THE SOLAR ENERGY SYSTEM IN ATLANTA IS THAT "IT IS ONE OF THE FIRST STEPS TOWARD REPLACING THE WORLD'S RAPIDLY DWINDLING OIL SUPPLY WITH AN ALTERNATIVE."

DOCTOR TEEM SAID EFFECTIVE USE OF THE SUN'S ENERGY WILL MEAN "WE WILL NEVER HAVE TO FEAR OUR ENERGY SOURCES RUNNING OUT." HE NOTED THAT SIX HUNDRED TIMES THE DAILY ENERGY NEEDS FALL ON THE UNITED STATES EACH DAY IN THE FORM OF SUNLIGHT. NEARLY ALL OF IT GOES TO WASTE. THE SOLAR SYSTEM DEDICATED AT THE SCHOOL IN

VOICE: ATLANTA IS A STEP TOWARD SAVING THE VALUABLE SOLAR
(CONT'D) ENERGY AND MAY BE A FORERUNNER OF BIGGER AND BETTER
SYSTEMS TO COME.

DOCTOR TEEM SAID "LET US HOPE MANY NEW SCHOOLS WILL
FOLLOW THIS EXAMPLE IN THE NEAR FUTURE AND ASSURE US
THAT HEATING OR COOLING BY THE SUN WILL BECOME COMMON-
PLACE RATHER THAN UNUSUAL."

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(NEW CAUSE OF DROUGHT -- 3-2581 -- RICHARDS)

EDITOR: LIVESTOCK ANIMALS MAY BE EATING THEMSELVES TO DEATH
BY DESTROYING THE SOURCE OF FUTURE RAINFALL IN DROUGHT-
PRONE AREAS OF THE WORLD. HERE IS ----- WITH A
REPORT.

VOICE: SCIENTISTS HAVE BEEN MYSTIFIED BY THE SUDDEN ONSET OF
DROUGHT IN AREAS LIKE THE SAHEL REGION -- SOUTH OF THE
SAHARA -- IN AFRICA. ONE EXPLANATION OFTEN CITED FOR
THESE LONG DRY PERIODS IS A GLOBAL SHIFT IN WEATHER
PATTERNS.

BUT DOCTOR RUSSELL SCHNELL OF THE U-S NATIONAL OCEANIC
AND ATMOSPHERIC ADMINISTRATION HAS A NEW THEORY. HE
BELIEVES THAT DROUGHTS ARE CAUSED BY OVERGRAZING OF
LIVESTOCK ANIMALS. HE BASES THIS ON THE ASSUMPTION
THAT VEGETATION, NOT SOIL, IS AN IMPORTANT SOURCE OF
ICE NUCLEI. ICE NUCLEI ARE THE MICROSCOPIC SOLIDS
ON WHICH ICE FREEZES TO MAKE RAIN IN CUMULUS CLOUDS.

VOICE:
(CONT'D)

WHEN ANIMALS OVERGRAZE, THEY EAT THE PRODUCERS OF ORGANIC ICE NUCLEI SO THAT FEWER AND FEWER SUCH PARTICLES ARE RELEASED INTO THE AIR. WITH FEWER NUCLEI AROUND TO FORM ICE CRYSTALS, THE CLOUDS DO NOT PRODUCE AS MUCH RAIN.

AS THE RAINFALL DIMINISHES, SO DOES PLANT LIFE. THIS CYCLE CONTINUES UNTIL THE AREA ENTERS INTO A DROUGHT PERIOD. THE CYCLE IS ONLY REVERSED WHEN THE ANIMALS ARE FORCED TO MIGRATE AND PLANT LIFE CAN GROW AGAIN. THE NEW PLANT LIFE RELEASES ORGANIC NUCLEI INTO THE AIR AGAIN, AND THE RAIN RETURNS.

DOCTOR SCHNELL SAYS THAT SATELLITE PHOTOGRAPHS SHOWED AREAS OF NEAR-NORMAL VEGETATION ADJACENT TO BARREN LAND. THE BARREN LAND WAS OVERGRAZED, WHILE THE OTHER LAND WAS NOT. THIS LED HIM TO CONCLUDE THAT IT WAS OVERFEEDING, NOT WORLDWIDE SHIFTS IN THE WEATHER, THAT CAUSES DROUGHTS.

(TURNING SLUDGE INTO SOIL -- 3-2581 -- DOSA)

EDITOR: THE CITY OF BANGOR, MAINE, IN THE NORTHEASTERN CORNER OF THE UNITED STATES, HAS FOUND A WAY TO TURN SLUDGE -- THE SOLIDS IN THE SEWAGE -- INTO FLOWERS, AND TO SAVE A LOT OF MONEY IN THE PROCESS. HERE IS ~~AN INTERESTING STORY~~ WITH THE STORY.

VOICE: THE SLUDGE FROM THE BANGOR MUNICIPAL SEWER SYSTEM HAD TO BE EITHER BURIED OR BURNED IN THE PAST, AN EXPENSIVE AND ENVIRONMENTALLY UNACCEPTABLE PROCESS. AT THE SAME TIME, BANGOR HAS BEEN SPENDING LARGE AMOUNTS OF MONEY EVERY YEAR TO PURCHASE SOIL CONDITIONERS, SUCH AS MUCH, FOR ITS CITY PARKS.

THANKS TO A NEW EXPERIMENTAL PROJECT, SUPPORTED BY THE U-S ENVIRONMENTAL PROTECTION AGENCY, BANGOR WILL BE ABLE TO REDUCE BY HALF THE MONEY IT SPENDS ON MULCH, AND SAVE THE ENTIRE COST -- FINANCIAL AND ENVIRONMENTAL -- OF BURNING OR BURYING ITS SLUDGE. THE CITY IS TURNING SLUDGE INTO COMPOST FOR USE AS A SOIL CONDITIONER.

THE HEAT GENERATED BY THE PROCESS KILLS ALL DISEASE-CARRYING BACTERIA, THUS MAKING THE COMPOST SAFE FOR PARKLAND USE. THE COMPOST, HOWEVER, WILL ONLY BE USED FOR NON-AGRICULTURAL APPLICATIONS FOR THE TIME BEING, UNTIL SCIENTISTS CAN DETERMINE WHETHER THE NON-BACTERIAL CONTAMINANTS IN SEWAGE SLUDGE, SUCH AS HEAVY METALS, MIGHT ENTER THE FOOD CHAIN.

THE COMPOSTING PROCESS WHICH COULD BE USED BY CITIES MUCH LARGER THAN BANGOR WITH ITS THIRTY-EIGHT-THOUSAND INHABITANTS, WAS DEVELOPED BY THE U-S DEPARTMENT OF AGRICULTURE. IT INVOLVES MIXING WASTE WOOD BARK WITH THE SLUDGE TO LOOSEN IT UP AND CREATE AIR SPACES. THE MIXTURE IS THEN PLACED ON A PERFORATED PIPE WHICH IS

VOICE:
(CONT'D)

ATTACHED TO AN AIR BLOWER. THIS DRAWS AIR THROUGH THE MIXTURE, AND THE OXYGEN IN THE AIR STIMULATES THE GROWTH OF CERTAIN BACTERIA WHICH GENERATES HEAT THROUGHOUT THE PILE. THE HIGH TEMPERATURE -- MORE THAN FIFTY DEGREES CELSIUS -- KILLS ALL THE DISEASE-CARRYING BACTERIA, MAKING THE COMPOST SAFE FOR USE IN THE PARKS.

THIS PROCESS GOES ON FOR THREE WEEKS. THEN THE COMPOST IS ALLOWED TO DRY FOR ABOUT A MONTH BEFORE IT IS READY TO USE. THE EXPERIMENTAL PLANT IN BANGOR CONVERTS ALL THE SLUDGE GENERATED BY THE CITY AND PRODUCES ABOUT FIFTY CUBIC METERS OF COMPOST EVERY WEEK.

ENVIRONMENTAL PROTECTION AGENCY OFFICIALS SAY THE BANGOR TECHNIQUE FOR TURNING SLUDGE INTO FLOWERS COULD BE USED IN MANY OTHER CITIES WITH SEWAGE TREATMENT PLANTS.

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